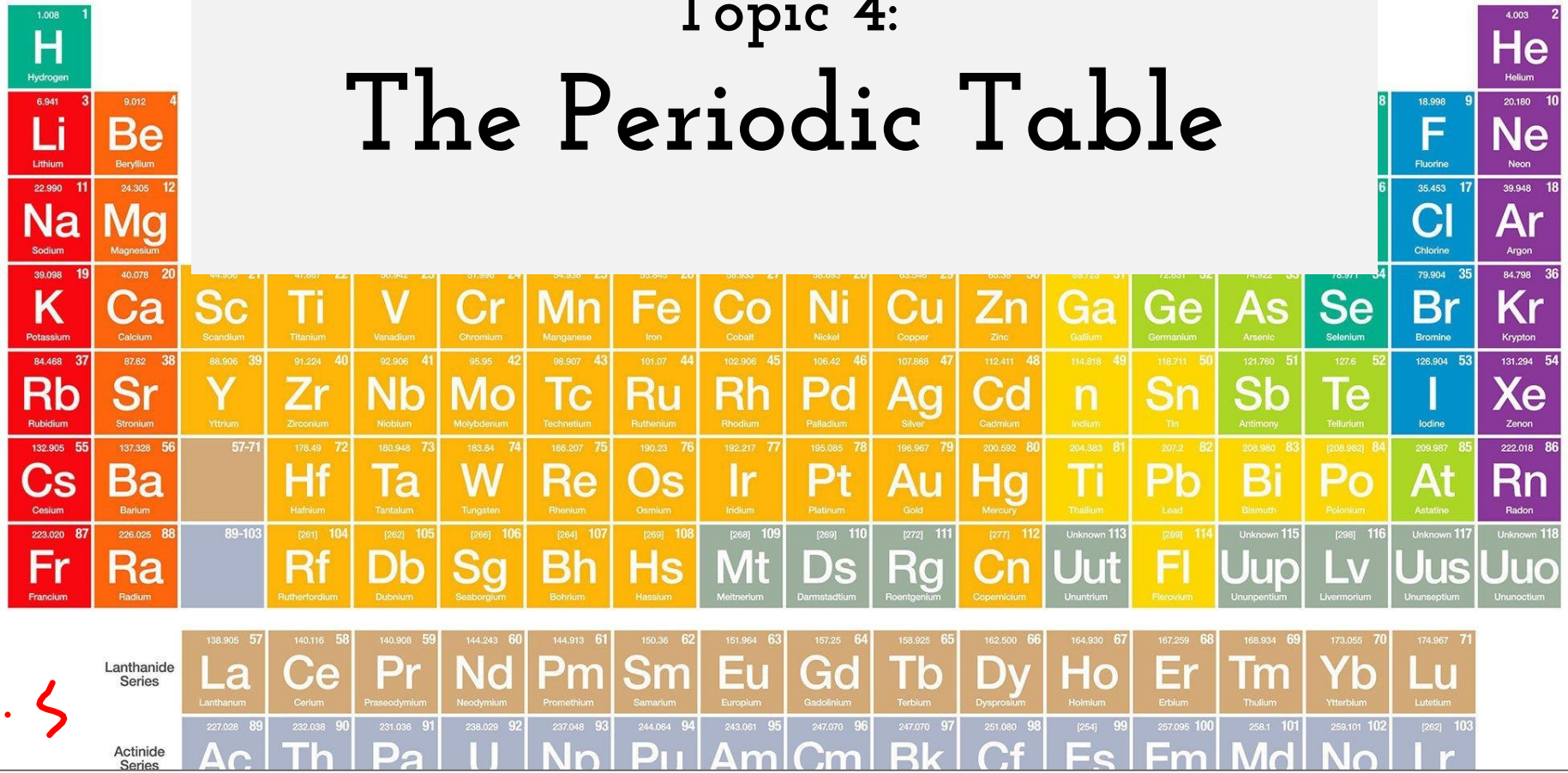
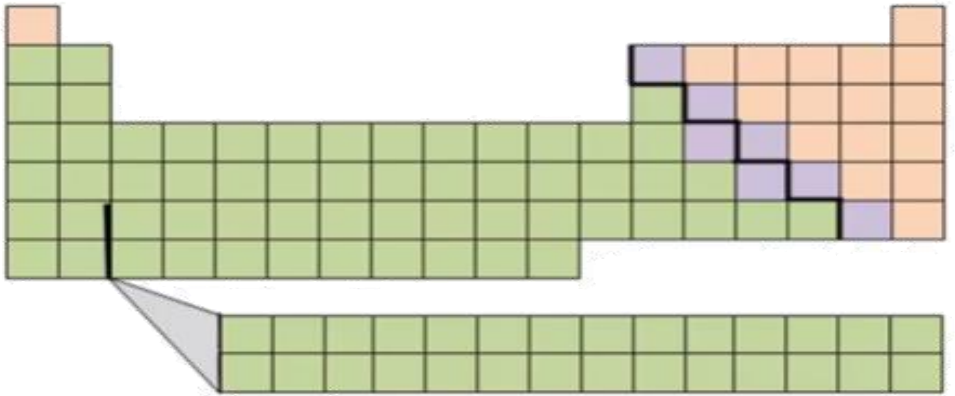
Topic 4:

The Periodic Table



In this lesson you will learn:

- ❑ how to classify elements based on their properties as metals, non-metals, and metalloids.
- ❑ how to find metals, non-metals, and metalloids on the periodic table.



Properties of Elements

- Everything around us is made of one or more elements.

Wires are made of **copper** (Cu-29)

Diamonds are made of **carbon** (C-6)

Milk & cheese contain **calcium** (Ca-20)

- Each kind of element has unique **properties**. (Singular = **property**)

special

cupric-Cu

Property - There are two definitions of the word "property"

1. An object **owned** by someone.
   Example: "That book is my property."

   Your example: My phone is my property because I own it.

Something about you that is different.

2. A **trait** of a **non-living** thing. (This is the definition we will use in chemistry)

   Example: "One property of air is that we cannot see it."

   Your example: One property of the paper is that it is green.

   Another example: One property of water is that it does not have a smell.

Properties of Elements

- No two elements are exactly the **same**, but there are elements that share some of same **properties**.
- Next, we will look at a way to **classify** elements based on their properties.

Remember: To **classify** means to put objects in groups that are the same in some way

Classifying Elements

- The elements can be classified into 3 groups based on their properties: **metals**, **non-metals**, and **metalloids**.

Properties of Metals

- **Shiny**
- Good conductors of **electricity**
- Good conductors of **heat**
- Can **bend** or **stretch**
- **Solid** at room temperature (except **Mercury (Hg)**, a liquid)

allows it to pass through

Properties of Non-Metals

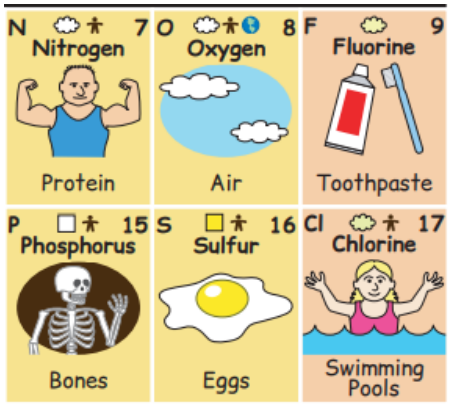
carbon

Neon

- Dull (the opposite of shiny)
- Do not conduct electricity
- Not good conductors of heat
- Do not bend or stretch as elements
- Solid, liquid, or gas at room temperature

carbon

Helium



Properties of Metalloids

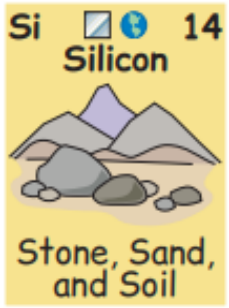
- **Mix** of metal and non-metal properties.
- **Semi-conductors** (We can control the electricity that goes through them. This is why metalloids are often used in electronic devices such as **phones** and **computers**.)
- **Solid** at room temperature
- Some are **shiny** but others are **dull**.

Silicon

Germanium

Arsenic

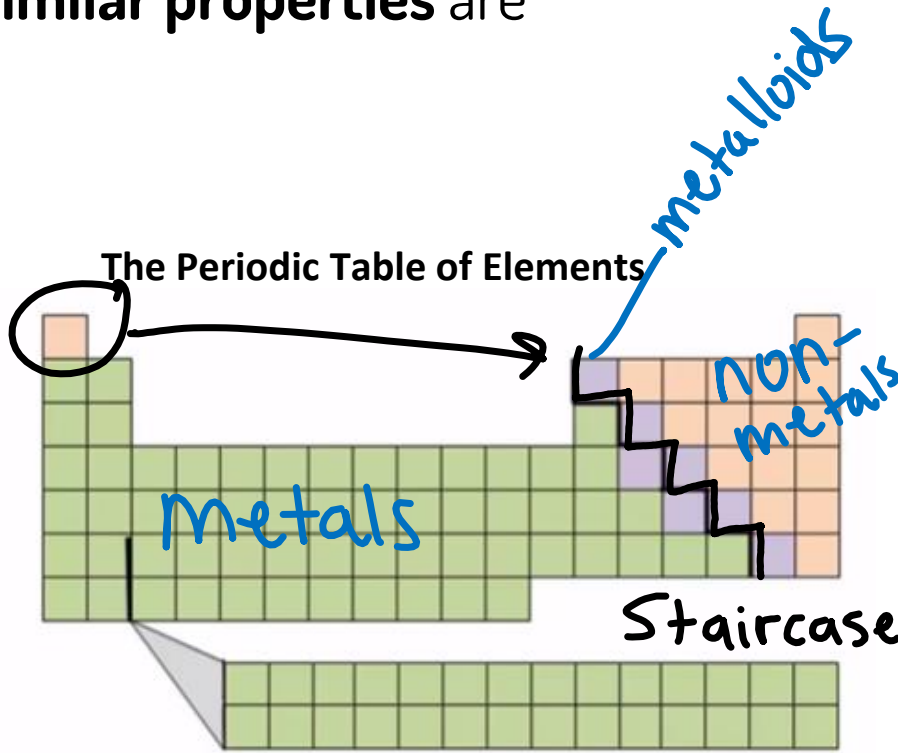
Calculator Circuit Board



The Periodic Table

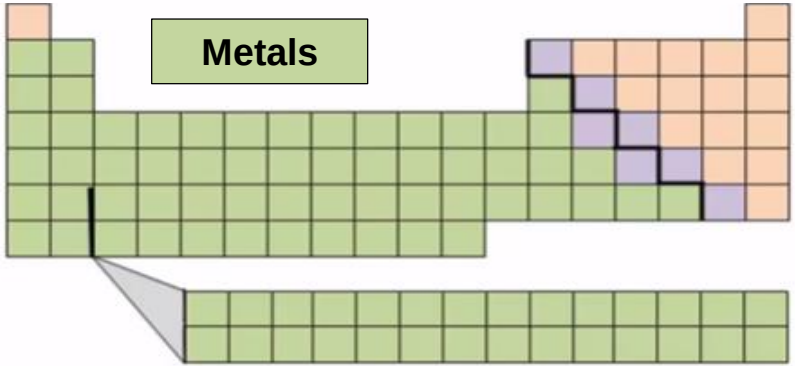
- On the periodic table, elements with **similar properties** are placed **together.**
  - **Metals** are to the ~~**right**~~ left of the **staircase**
  - **Non-metals** are to the ~~**left**~~ right of the staircase
  - **Metalloids** are **touching** the staircase

- ☐ Metals
- ☐ Non-metals
- ☐ Metalloids

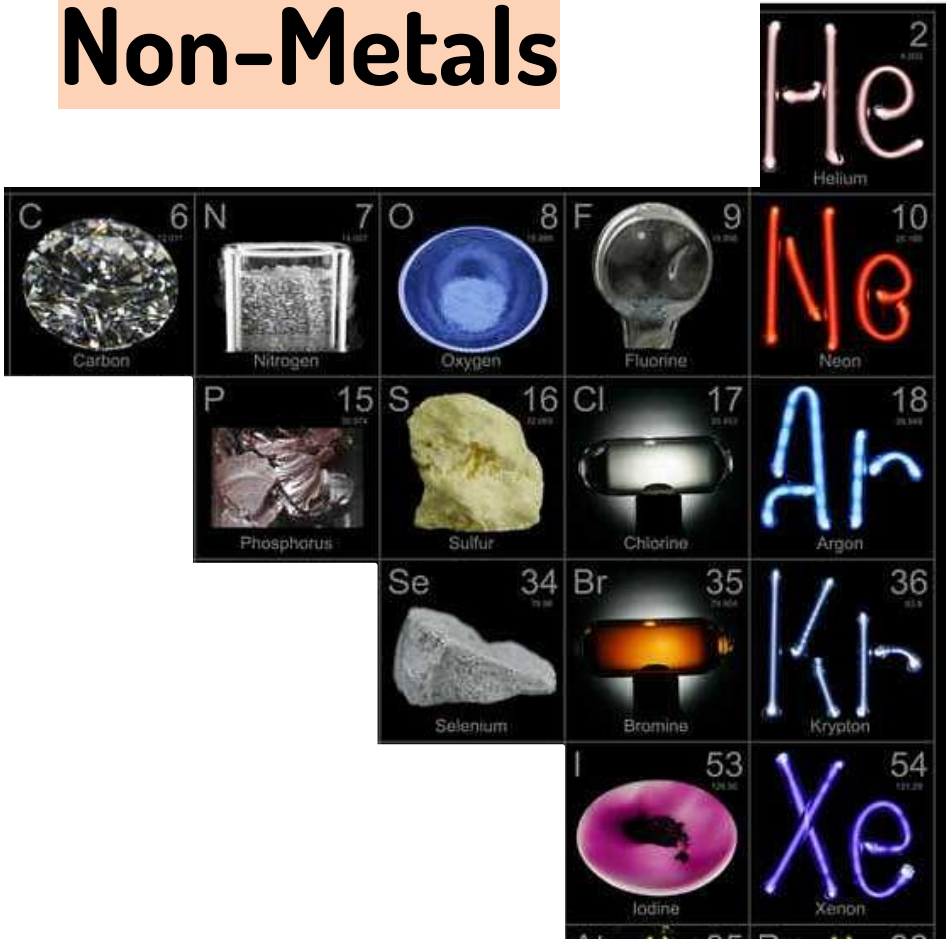


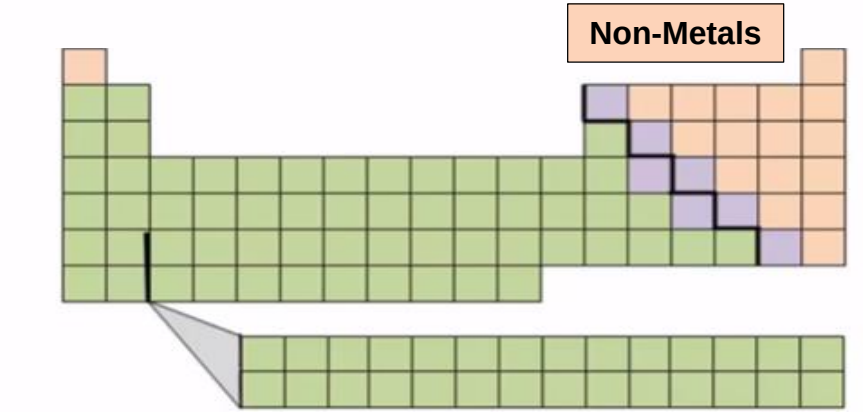
Metals

- The elements to the **left** of the "**staircase**" are the **metals**.



Non-Metals

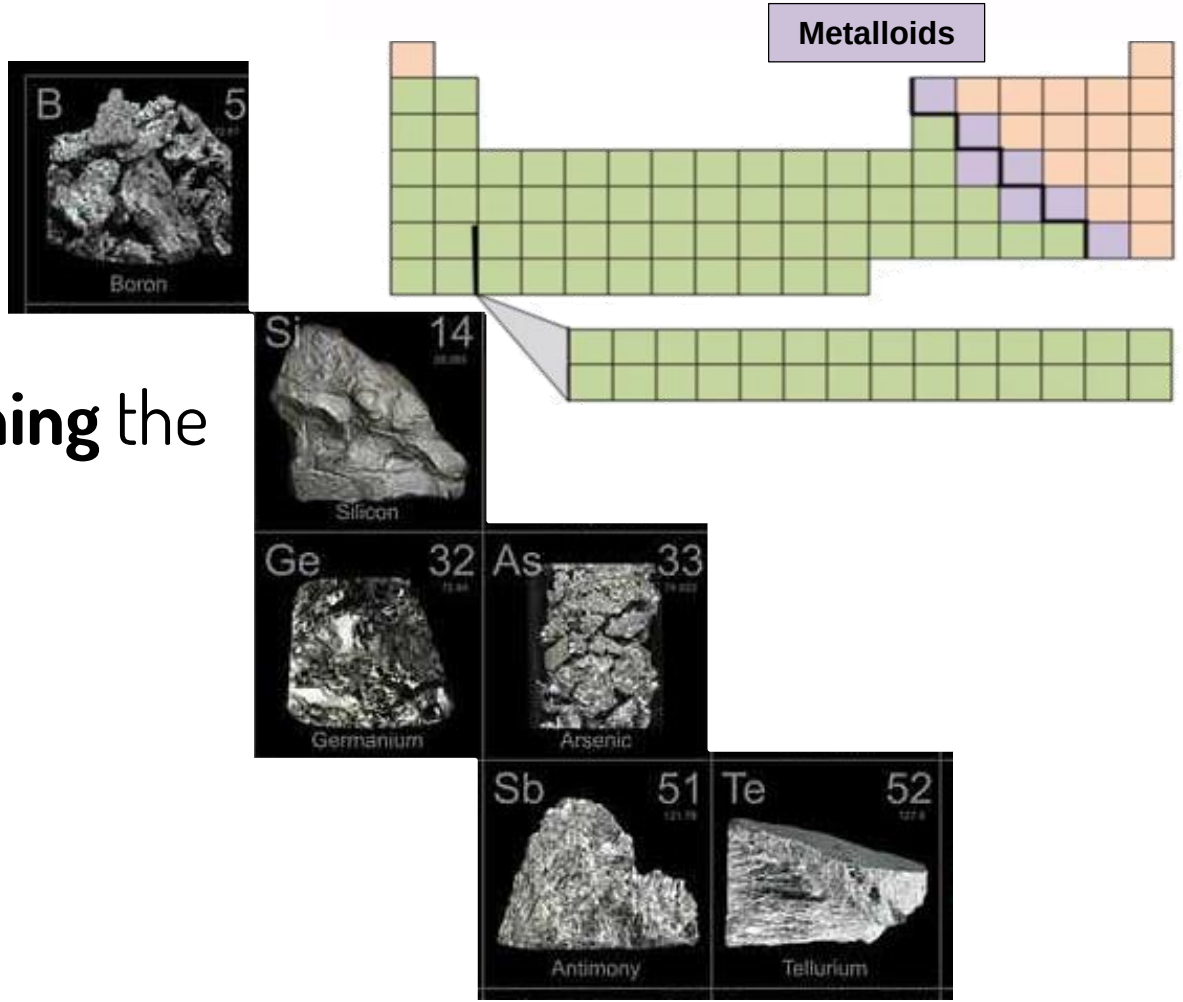




- The elements to the **right** of the "**staircase**" are the **non-metals**.

Metalloids

- The elements **touching** the “staircase” are the **metalloids**.



Check Your Understanding

Determine whether each of the following is a metal, non-metal, or metalloid:

1. An element that is shiny and a good conductor of heat _____
2. An element that is dull and does not conduct electricity _____
3. An element that is a shiny semi-conductor of electricity _____
4. An element that is a liquid at room temperature and is located to the right of the staircase on the periodic table. _____
5. An element that is a liquid at room temperature and is located to the left of the staircase on the periodic table _____

6. Sodium _____
7. Helium _____
8. Arsenic _____
9. Argon _____
10. Magnesium _____
11. Iron _____
12. Silicon _____
13. Fluorine _____
14. Calcium _____
15. Boron _____